



Buildings for the 21st Century

Buildings that are more energy-efficient, comfortable, and affordable...that's the goal of DOE's Office of Building Technology, State and Community Programs (BTS). To accelerate the development and wide application of energy efficiency measures, BTS:

- Conducts R&D on technologies and concepts for energy efficiency, working closely with the building industry and with manufacturers of materials, equipment, and appliances
- Promotes energy/money saving opportunities to both builders and buyers of homes and commercial buildings
- Works with State and local regulatory groups to improve building codes, appliance standards, and guidelines for efficient energy use
- Provides support and grants to States and communities for deployment of energy-efficient technologies and practices



MAILI II: EMPHASIZING THE PUBLIC IN HOUSING

When architect Edwin Santa Maria of Takeo Matsumoto and Associates, Inc. began designing the recent reconstruction of the Maili II federal public housing project, he had many tools at his disposal: the latest technology in building design, more durable building materials and energy-efficient home appliances, to name a few. But Santa Maria had one perspective that most other architects who design public housing don't: he used to live in one. In the late 1960's, the Santa Maria family moved from the Philippines into a public housing project in Aiea; the future architect was 2 years old.

At the time, the original Maili II was almost 30 years old and plagued with termites, the presence of hazardous materials, and outdated design and construction flaws. The housing project failed to meet building code requirements. A consultant report determined that the most cost-effective solution was to demolish Maili II and build it again—newer and better. Working with federal money from the Department of Housing and Urban Development (HUD), Santa Maria Architects designed public housing for low-income residents—housing that was both comfortable and energy efficient. Along the way, they created an environment for the 24 residential families that is more cheerful and spacious—built with the public in mind.

IMPROVING FORM AND FUNCTION

To make the housing more pleasing to its inhabitants, Santa Maria increased the total floor area of the units by 52 percent; two of the 24 units are wheelchair accessible and an additional two are designed to meet the needs of people who are sight or hearing impaired. He also added to the esthetic value by abandoning the traditional public housing exterior color choices of yellow and dark brown in favor of tropical tones of green and pink. Electric, telephone, cable TV and a street lighting system were moved underground to enhance community aesthetics. Sidewalks were added, along with more parking, wider driveways and improved storm water drainage. In addition, the project now has beautiful landscaping and two play areas for children.

Three other issues that plagued the old Maili housing project were also addressed: water conservation, unit durability and termite infestation. Low-flow water fixtures and a clotheslines for drying clothes were installed, as well as an irrigation system timed for night-time watering. To prevent termite problems, a new treatment called *Termi-Mesh* was used within the concrete foundations. The units that stand today are more durable and designed to handle the effects of the high salt air content thanks to the vinyl framed jalousie windows, fiberglass reinforced exterior

doors and asphalt shingle roofs with stainless steel flashing. Improved flooring, countertops, cabinetry and bathtubs add to the comfort level of the residents, as well as to the durability of the units. All of these improvements greatly reduce the maintenance needs of each unit.

A DIFFERENT APPROACH TO ENERGY USE

The approach to saving energy by the entire team was different for this successful project. According to Michael Flores of HUD, "Maili II was not intended just to provide minimal shelter, but rather to be comfortable, durable and energy-efficient housing." Reducing energy consumption in Hawaii is important because almost 90 percent of the state's energy comes from imported oil and coal. And while Hawaii residents may not use as much energy as other Americans, they pay more for what they do use.

Located on the leeward coast of Oahu, Maili II is in the town of Waianae. The climate in this part of Hawaii is hot and dry, so when the state's public housing agency had the opportunity to reconstruct the units, energy efficiency and resident comfort were top priorities. Housing and Community Development Corporation of Hawaii (HCDCH) knew first hand that high energy costs have a significant impact on the affordability of public housing

- units.
- The completed project included these energy-saving designs and technologies, some of which further added to the comfort of the residents:
- Longer roof overhang to shade the walls from direct sunlight
 - Reflective insulation radiant barrier as part of the roof system to minimize heat gain through the roof surface
 - Ridge vents and mini-vents at the top of the walls to remove trapped hot attic air
 - Vaulted ceilings



An architect's rendering of the Maili II housing project.

- An 8-inch concrete masonry unit (CMU) exterior wall system wrapped with an exterior insulation finish system of thermal resistance insulation boards to reduce heat gain through the exterior walls
- Solar water heating system
- Tinted glass for the jalousie windows to reduce heat gain through the window
- Larger window and screen doors for better ventilation

- Compact fluorescent light (CFL) fixtures on the exterior and fluorescent lights in the interior
- Efficient electric stoves replacing older gas stoves
- Landscaping with more native trees and shrubs to absorb sunlight and create a cooler living space

ENERGY CONSERVATION "CATCHING ON"

The energy savings from these improvements on Maili II are substantial. Hawaiian Electric Company, Inc. (HECO) estimates the annual savings of the project to be more than 100,000 kWh. Each unit will use about 4,000 kWh, or 42%, less than the average Oahu household, depending on the use characteristics of the individual families.

These energy savings are not at the cost of comfort. Through better design and improved technology in building materials, the need for air conditioning was eliminated. Those who know the "before and after" of Maili II say that the interior of the units are now about 10 degrees cooler. The biggest single energy saver by far is the solar water heater, allowing for free hot water.

As the owner of Maili II, HCDCH hopes to use their success as a model for other construction projects. Darrell Chun of HCDCH states, "Energy conservation is the way to go, whether it's a rehab or new construction in public housing." Chun adds, "Energy conservation is an idea that is finally catching on in the building industry."

For more information, contact:

Energy Efficiency and Renewable Energy Clearinghouse (EREC)

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Or visit the BTS Web site at:
www.eren.doe.gov/building

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EMPHASIZING THE PUBLIC IN HOUSING

AWARD-WINNING TEAM

The team of experts who worked on the new Maili II is becoming a very decorated group. In September 2000, during Oahu's premier energy conference, the Energy Expo, HECO awarded Maili II the "HECO Energy Efficiency Award" in the Residential category. Through its annual Energy Award Program, HECO rec-



Maili II residents gather at an "open house" event.

ognizes outstanding energy design in Hawaii in both residential and commercial sectors.

The Hawaii chapter of the American Public Works Association at its annual ceremony awarded the Maili II teams its "Project of the Year" award for structures in the \$2-10 million range. The U.S. Department of Housing and Urban Development (HUD) also recognized the energy savings improvements at Maili II with a local HUD Best Practice award.

ABOVE AND BEYOND

Jim Maskrey of HECO believes HCDCH deserves a tremendous amount of credit for their vision of energy efficiency and their commitment to improving the lives of the citizens they serve.

Maskrey explains, "In the design and construction of Maili II, HCDCH went beyond the code and legal requirements to do the right thing. HECO would love to see all public housing built with an eye on energy efficiency and solar water heating to bring down user costs so the residents can spend money in other sectors of the economy and improve their quality of life."

Architect Santa Maria has seen his vision of comfortable, efficient public housing, designed with the public in mind, come to life at Maili II.